



Influence of riverine connectivity on phytoplankton abundance and diversity of associated wetlands of River Ganga: A comparative study of an open and a closed wetland

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River connectivity is often described as a key requirement for maintaining the health and biodiversity of associated wetlands of rivers. A comparative study was undertaken to understand the influence of river connectivity on plankton diversity and abundance in an open (Chharaganga Beel) and a closed wetland (Kalobaur Beel) situated on the banks of River Ganga in West Bengal, India. During the present investigation, data revealed that the major groups of phytoplankton recorded were Cyanobacteria (33.12%), Bacillariophyta (29.07%), and Chlorophyta (22.34%) from the open wetland, and Bacillariophyta (47.40%), Euglenozoa (30.68%), and Chlorophyta (10.12%) from the closed one. Shannon diversity (H') and Margalef's species richness index indicate that phytoplankton diversity in the Chharaganga ecosystem was higher than in Kalobaur Beel. A one-way ANOVA showed significant station-wise difference for water turbidity ($p < 0.05$) in both of the beels, and student t test revealed that differences in physico-chemical parameters between the studied beels was statistically significant ($p < 0.05$) for depth, turbidity, conductivity, total hardness, nitrate, total N, phosphate-P, silicate, Ca^{2+} , Mg^{2+} and chlorophyll a , whereas abundance of phytoplankton groups was significantly different for Bacillariophyta ($p < 0.05$) and Euglenozoa ($p < 0.05$). The positive correlation of total N with Euglenozoa ($r = 0.496$; $p < 0.05$) might be the cause of favourable conditions for a higher abundance of Euglenozoa in the closed Kalobaur Beel, which is on the verge of partial eutrophication. The hydrological flushing by river water in the Chharaganga wetland maintains the ecological stability. Therefore, restoration of river connectivity is recommended to improve the health of the disconnected wetlands.

Keywords: wetland health, plankton dynamics, hydrological regime

Introduction

Wetlands are considered as important natural resources due to their rich biodiversity, and have been identified as performing various ecological

roles; thus, protection of wetlands has become a major concern globally (Bobbink et al., 2006). Ganga basin-associated open wetlands are mainly formed due to sloughs, tectonic depressions, and meander scroll depressions, and receive surface